TRANSPORT

Intended for
Balfour Beatty & Lincolnshire County Council

Document type
Report

Date
10/06/24

NORTH HYKEHAM RELIEF ROAD
REPEAT STAGE 1 ROAD SAFETY AUDIT REPORT
A46 HYKEHAM ROUNDABOUT

TRANSPORT

NORTH HYKEHAM RELIEF ROAD
REPEAT STAGE 1 ROAD SAFETY AUDIT REPORT A46 HYKEHAM ROUNDABOUT

Project name	**North Hykeham Relief Road**
Project no.	**1620013942**
Recipient	**Balfour Beatty & Lincolnshire County Council**
Document type	**Report**
Revision	**C01**
Date	**10/06/24**
Prepared by	**S.Hawley**
Checked by	**G.Turner**
Approved by	**S.Hawley**
Document no.	**NHRR-RAM-HGN-HYKE-RP-CH-01027**
Suitability Status	**A4 - Approved & Accepted at Stage 4**
Functional Breakdown	**Highways-General**
Spatial Breakdown	**North Hykeham Relief Road**

Ramboll
2nd Floor, The Exchange
St. John Street
Chester
CH1 1DA
Unite Kingdom

T +44 1244 311855
https://uk.ramboll.com

Revision	Date	Prepared by	Checked by	Approved by	Description
C01	**15/05/25**	SH	GT	SH	**First Issue**
P01	10/06/24	SH	GT	SH	First Issue

Ramboll UK Limited
Registered in England & Wales
Company No: 03659970
Registered office:
240 Blackfriars Road
London
SE1 8NW

CONTENTS

TABLE OF TABLES

TABLE OF FIGURES

APPENDICES

1. INTRODUCTION

1.1 Description of the Scheme, Objective and the Locality

This report describes a Repeat Stage 1 Road Safety Audit (RSA) carried out on the design works associated with North Hykeham Relief Road (NHRR) A46 Junction and covers the Lincolnshire County Council (LCC) network and the National Highways (NH) network reported in a separate section.

The A46 Roundabout area that comprises the subject of this Stage 1 Road Safety Audit comprises of the re-modelling of the existing roundabout into a signal-controlled roundabout that is significantly larger and provides pedestrian and cycle provision between Middle Lane, NHRR and Newark Road.

Note - A Stage 1 RSA undertaken for the whole scheme as described below, included the A46, Hykeham Roundabout, Middle Lane and Newark Road. Following consultation with national Highways and a review of the traffic modelling/Linsig model and addressing RSA Problems raised, the layout has been amended. At the request of National Highways, a new (Repeat) RSA Stage 1 on this A46 layout is required.

The NHRR, previously known as the Lincoln Southern Bypass (LSB), will link the recently constructed Lincoln Eastern Bypass (LEB) with the Lincoln Western Relief Road (LWRR) and the A46 on the Strategic Road Network (SRN). The NHRR is the last major highway scheme contained within the Lincoln Integrated Transport Strategy (LITS). The NHRR is also the last element of a complete ring road around the greater Lincoln urban area comprising both Lincoln and North Hykeham. The completed ring road will comprise of four sections of carriageway: the Lincoln Western Relief Road (LWRR), the Lincoln Northern Relief Road (LNRR), the Lincoln Eastern Bypass (LEB), and the NHRR. The NHRR will also form part of the Lincolnshire Coastal Highway.

The NHRR, comprises a Dual All-Purpose 2 lane Carriageway with a combined foot and cycleway, linking the A46 to the Lincoln Eastern Bypass (LEB). The combined footway and cycleway runs to the north of the east-bound carriageway between the A46 and Station Road. From Station Road to Grantham Road, the combined footway/cycleway will run to the south of the westbound carriageway before returning to the north of the east-bound carriageway between Grantham Road and the A15 Sleaford Road where it will connect to the LEB combined footway/cycleway. Feature requirements include:

- River Witham Crossing
- Station Road Crossing
- A46 NMU Crossing
- Wath Lane NMU Crossing
- Viking Way NMU Crossing
- Additional arm to A46 Roundabout
- New South Hykeham Road Roundabout
- New (A607) Grantham Road Roundabout
- New Brant Road Roundabout
- Additional arm to LEB Roundabout
- Green Lane Drain Crossing
- South Hykeham Drain Crossing
- Waddington Dyke Drain Crossing

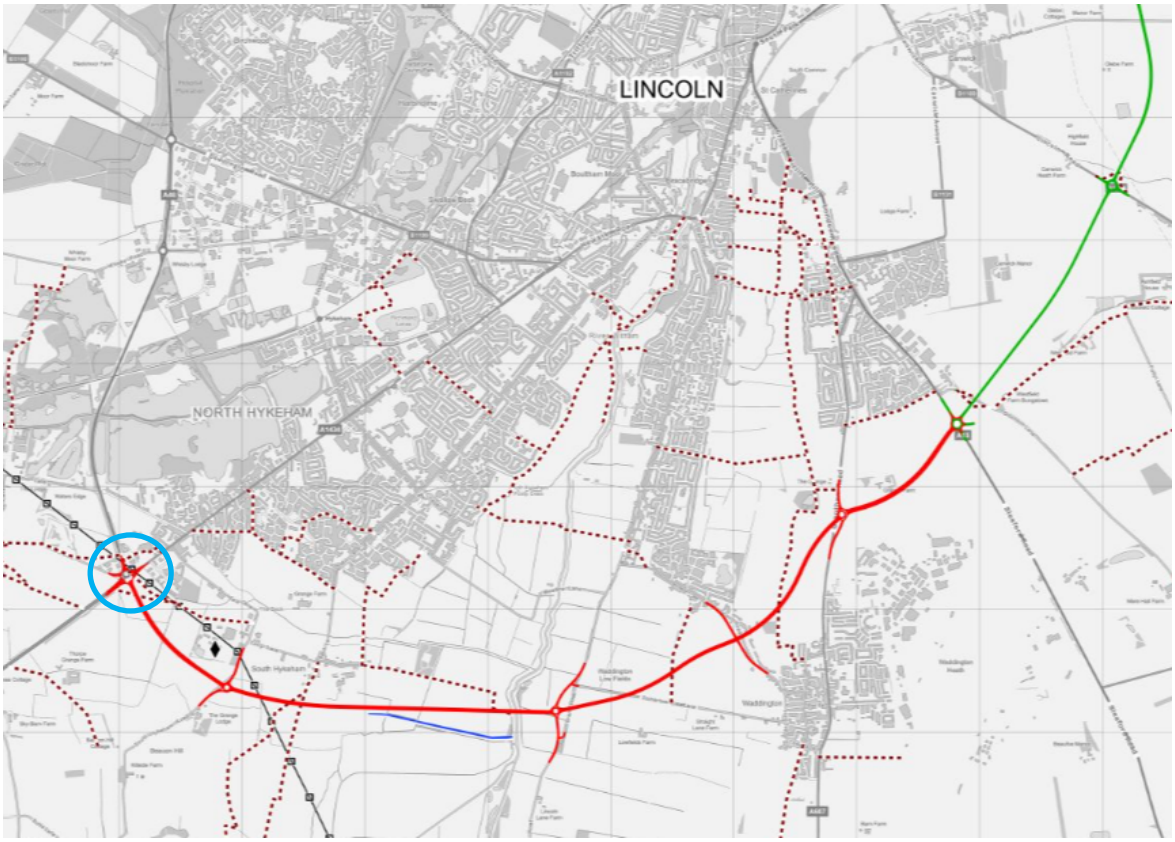


Figure 1 – Location Plan, NHRR (Red), LEB (Green)

1.2 Operational Objectives

The operational objectives and outcomes of the NHRR are as follows:

- To provide an additional east-west route for local and strategic traffic;
- To improve access between the strategic A46 and the eastern side of Lincoln including the LEB;
- Reduced rat running traffic through southern Lincoln and North Hykeham as a result of east-west traffic using appropriate routes;
- To provide a new link to unlock land allocated for the South-Western Quadrant (SWQ);
- Increased network capacity to accommodate housing growth;
- To improve route choice for east-west movements to reduce traffic and congestion on the existing orbital network and key routes through Lincoln;
- The expansion of the orbital network around Lincoln; and
- To improve strategic and local route choice to improve network resilience.

1.3 Outcomes

Development of an Effective & Efficient Transport Network:

- Through improved east-west connectivity in the south of Lincoln for strategic and local traffic;
- Through reduced traffic levels on local urban and rural roads in the South of Lincoln through the transfer of strategic traffic to appropriate routes; and

- Through reduced NMU severance in South Lincoln caused by high levels of traffic on the local road network and lack of east west connectivity.

Delivery of Housing:

- To support the delivery of the SUEs by improving access to the identified sites.
- To support the delivery of the SWQ through the provision of additional network capacity and NMU infrastructure necessary for the delivery of new housing.

Sustainable Economic Growth:

- To reduce traffic levels and congestion on the existing orbital road network around Lincoln and on key routes through the city to support:
  - Improved access to central Lincoln;
  - The improvement of access to the Humber Ports and Airport; and
  - The improvement of access to the Lincolnshire Coast.
- To improve the resilience of the orbital and key route network through and around Lincoln and reduce the impact of major incidents.

1.4 Relevant factors which may affect road safety

Proximity to the Strategic Road Network (SRN) – A46.
Planning applications have been approved in full and in outline respectively for the following applications which are available for review from the LCC planning portal.

- 21/1125/FUL
- 20/0057/OUT

1.5 The Road Safety Audit Team

The Road Safety Audit (RSA) Team comprised:

RSA Team Leader	Simon Hawley, BEng (Hons), CEng, MICE, MCIHT, MSoRSA, Director of Highways & Infrastructure, Ramboll Limited and holder of EC Directive 2008/96/EC Certificate of Competency for audit work on the TERN and UK motorways and trunk roads (unreferenced TMS certificate, issued on behalf of Highways England).
RSA Team Member	Graeme Turner BEng (Hons), MSoRSA, Associate of Glanville Consultants Limited acting on behalf of Ramboll.

The terms of reference of the RSA are as described in the DMRB, Volume 5, Part 2, GG119 "Road Safety Audit", Chapter 5, paragraphs 5.1 to 5.3 and are inclusive of Notes 1 to 4 included therein.

1.6 Road Safety Audit Method

A copy of the approved RSA Brief was issued to the RSA Team on Wednesday 24th April 2024.

The RSA was based on information provided by the Design Team listed below and on observations obtained during a daylight site visit attended by the RSA Team members on Wednesday 24th April 2024. The weather during the site visit was cold, with intermittent rain showers. Road surfaces were damp. Visibility was generally good.

The RSA Report was subsequently prepared at the Ramboll Limited premises during May 2024 for the Overseeing Organisation, Lincolnshire County Council also acting on behalf of National Highways.

The RSA team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the designs to any other criteria.

The RSA Team was approved by Dave Chetwynd of Lincolnshire County Council and Catherine Townend of NH on 13th April 2024.

The RSA Team was instructed by RUK, on behalf of Balfour Beatty. The RSA was carried out in accordance with the Road Safety RSA Brief issued by RUK, in their capacity as Design Team. The Brief comprised:

- 15-page RSA Brief document ref. NHRR-RAM-HGN-HYKE-RP-CH-01024
- Location Plan
- Forecast traffic flows
- Collision data analysis
- Documents and Drawings:

Document/Drawing Number	**Document/Drawing Title**	**Revision**
NHRR-RAM-ENM-HYKE-RP-TR-00005	GG 142 WCHAR Assessment	C01
NHRR-RAM-HML-HYKE-RP-TR-00005	A46/A1434/NHRR Hykeham Roundabout Geometry Assessment	P03
NHRR-RAM-HGN-HYKE-TN-CH-00001	Road Safety Audit Team Request for Approval	P02
NHRR-RAM-HGN-HYKE-RP-CH-01007	Stage 1 Road Safety Audit Brief (Whole Scheme)	P03
NHRR-RAM-HGN-HYKE-RP-CH-01010	Stage 1 Road Safety Audit Report (Whole Scheme)	C01
NHRR-RAM-HGN-HYKE-RP-CH-01011	Stage 1 Road Safety Audit Response Report (Whole Scheme)	P01
NHRR-RAM-GEN-HYKE-MP-VT-00003	Site Location Plan	P01
NHRR-RAM-EGN-HYKE-MP-LE-30001	Constraints Plan	P03
NHRR-RAM-HGN-HYKE-DR-CH-01041	A46 Accident Plan (6 Year Data to January 2024)	P02
NHRR-RAM-HGN-HYKE-DR-CH-01045	Proposed Speed Limits	P01
NHRR-RAM-HGN-HYKE-DR-CH-01054	Proposed Design Speeds	P01
NHRR-RAM-HGN-HYKE-DR-CH-00011	Planning Application General Arrangement Sheet 1	P04
NHRR-RAM-HGN-HYKE-DR-CH-01002	Layout sketch with Lane Widths, Peak Hour PCU's and Entry Path Radii	P01
NHRR-RAM-HGN-HYKE-DR-CH-60100	Articulated Lorry Vehicle Tracking	P01
NHRR-RAM-HGN-HYKE-DR-CH-60101	Swept Paths – Roundabout Entry, Circulation and Exit	P01
NHRR-RAM-HGN-HYKE-DR-CH-01004	Swept Paths – Entry into Service Area	P01
NHRR-RAM-HGN-HYKE-DR-CH-01005	Planning Application Lighting Layout	P02
NHRR-RAM-HGN-HYKE-DR-CH-01020	Forward visibility at entry	P06
NHRR-RAM-HGN-HYKE-DR-CH-01025	Visibility to the right at entry	P05
NHRR-RAM-HGN-HYKE-DR-CH-01008	Visibility to the right 15m in advance	P06
NHRR-RAM-HGN-HYKE-DR-CH-01035	Circulatory visibility	P06
NHRR-RAM-HGN-HYKE-SK-CH-01015	Entry path radius	P04
NHRR-RAM-HGN-HYKE-DR-CH-01056	Red Line Boundary	P01

1.7 Collision data analysis

Collision data for the 6 years to January 2024 has been provided by Lincolnshire Road Safety Partnership and has been used to produce the following drawings/accident bubble diagram:

- NHRR-RAM-HGN-HYKE-DR-CH-01041 – A46 Accident Plan (5 Year Data to January 2023)

The data provided identifies a total of 15 No. collisions within the vicinity of the proposed scheme for the 6-year period to January 2024 within the vicinity of the A46 North Hykeham Roundabout. 12 No. of these were 'slight', with 3 No. 'Serious'.

1.8 Departures from standards

None

1.9 Previous road safety audit stage reports, road safety audit response reports and evidence of agreed actions

- Stage 1 Road Safety Audit Brief – NHRR-RAM-HGN-HYKE-RP-CH-01007
- Stage 1 Road Safety Audit Report – NHRR-RAM-HGN-HYKE-RP-CH-01010
- Stage 1 Road Safety Audit Response Report – NHRR-RAM-HGN-HYKE-RP-CH-01011

1.10 Strategic decisions

None

1.11 Design standards applied to the scheme design

DMRB Standards			
Standard	**Version**	**Date**	**Title**
CD 109	Version 1	Mar 2020	Highway link design
CD 127	Version 1.0.1	Jul 2021	Cross-sections and headrooms
CD 116	Version 2	Apr 2020	Geometric design of roundabouts
CD 122	Version 1.1.1	Jan 2022	Geometric Design of grade separated junctions
CD 123	Version 2.1.0	Nov 2021	Geometric design of at-grade priority and signal-controlled junctions
CD 143	Version 2.0.1	Mar 2021	Design for walking, cycling and horse-riding
CD 169	Version 1.0.1	Mar 2021	The design of lay-bys, maintenance hardstandings, rest areas, service areas and observation platforms
CD 192	Version 1	Jan 2020	The design of crossovers and changeovers
CD 195	Version 1.0.1	Mar 2021	Designing for cycle traffic
Other Standards/Guides			
Department for Transport LTN 1/20 July 2020 Cycle Infrastructure Design			
Manual for Streets			
Manual for Streets 2			
Disability advice (https://www.gov.uk/government/publications/inclusive-mobility-making-transport-accessible-for-passengers-and-pedestrians)			

IHE Guidelines for Motorcycling (https://motorcycleguidelines.org.uk)
Inclusive mobility- a guide to best practice on access to pedestrian and transport
Infrastructure (https://www.gov.uk/government/publications/inclusive-mobility-making-transport-accessible-for-passengers-and-pedestrians)RNIB
RNIB '' Who put that there! The barriers to blind and partially sighted people getting out and about (rnib.org.uk)

1.12 Design Speeds

The following design speeds have been proposed and agreed with Lincolnshire County Council;
A46 Dual Carriageway – 120kph
A46 Single Carriageway – 100kph
Middle Lane – 100kph
A1434 Newark Road – 70kph
NHRR – 120kph
For details, refer to drawing NHRR-RAM-HGN-HYKE-DR-CH-01054 – Proposed Design Speeds

1.13 Speed Limits

The following speed limits have been proposed and agreed with Lincolnshire County Council;
A46 Dual Carriageway –70mph (National Speed Limit)
A46 Single Carriageway – 60mph (National Speed Limit)
Middle Lane – 60mph (National Speed Limit)
A1434 Newark Road – 40mph/60mph
NHRR – 70mph (National Speed Limit)

For details, refer to drawing NHRR-RAM-HGN-HYKE-DR-CH-01045 – Proposed Speed Limits

1.14 Existing traffic flows/queues

Assessment of the existing traffic and junction capacities are detailed in the following documents for the existing junctions that will form part of the NHRR scheme included in Appendix 1;

- A46 Roundabout – NHRR-RAM-HML-HYKE-RP-TR-00005 – A46/A1434/NHRR Hykeham Roundabout Geometry Assessment. Note that this is referenced in the design information provided to the RSA team as Hykeham Roundabout also referred to as 'Pennells Roundabout'.

Traffic Model data has been supplied by WSP, with data extracted from the Saturn traffic model prepared by WSP, known as the Greater Lincoln Transport Model (GLTM) strategic model. This model has been approved for use by National Highways as part of the Central Lincolnshire Local Plan (as approved in 2022).

1.15 Forecast traffic flows

Geometry assessments for the proposed roundabouts and the modification of the existing roundabouts are detailed in the following documents included in the associated ProjectWise issue;

- A46 Roundabout – NHRR-RAM-HML-HYKE-RP-TR-00005 – A46/A1434/NHRR Hykeham Roundabout Geometry Assessment

Traffic Model data has been supplied by WSP, with data extracted from the Saturn traffic model prepared by WSP, known as the Greater Lincoln Transport Model (GLTM) strategic model.

Pedestrian, cyclist and equestrian desire lines
GG 142 WCHAR Assessment, document NHRR-RAM-ENM-HYKE-RP-TR-00005 has been undertaken in order to review pedestrian, cycle and equestrian facilities and facilitate the inclusion of all walking, cycling & horse-riding (WCH) modes in the scheme design process from the earliest stage and to identify opportunities for improved facilities and integration with the local and national network analysis.
Survey data is provided within Section 4.4 of the GG 142 WCHAR Assessment.

Environmental constraints
No environmental constraints are noted within the RSA Brief.

2. GENERAL POINTS

1. No contour plans including drainage proposals and the location of gullies have been provided to the RSA team, hence road safety related hazards associated with surface run-off/ponding cannot be determined.
2. No fencing / edge protection including vehicle restraint systems have been provided within the RSA brief documentation and there are areas of high embankment heights which may result in injury to NMUs or errant vehicles leaving the carriageway.
3. Vehicle swept paths for some movements have not been provided within the RSA brief documentation, but where possible road safety related hazards have been identified.
4. Although some Repeat RSA Problems may be mainly on LCC highway the RSA team consider that there is likely to be a close interface with National Highways hence some Problems are referenced as applicable to both highway authorities.

3. ITEMS RAISED IN THE PREVIOUS STAGE 1 ROAD SAFETY AUDIT

The following problems raised remain or have a related Repeat Stage 1 Problem and are included in this report:

- Problem 1 NH - A46 (north) western side - Transition/tie-in details of proposed footway is not adequate. Repeat Stage 1 comments – This problem has not been addressed.
- Problem 1 NH LCC - The crossing (at-grade) of the A46 from the existing public footpath TOTM/17/1 has not been considered. Repeat Stage 1 comments – although this problem has been addressed there is a related Repeat Stage 1 Problem identified, refer to Problem 2 NH LCC of this Repeat Stage 1 RSA.
- Problem 2 NH LCC - The A1434 Newark Road on the W/B approach to Hykeham Roundabout indicates that the existing W/B single lane develops into 3 lanes over a shorth distance of approximately 25m. Repeat Stage 1 comments – This problem has not been fully addressed in terms of the length of the diverge taper.

4. ITEMS RAISED AT THIS REPEAT STAGE 1 ROAD SAFETY AUDIT RELATING TO THE NATIONAL HIGHWAYS (NH) ROAD NETWORK

PROBLEM 1 NH	
Location:	A46 southbound carriageway towards Hykeham Roundabout (Location 1 NH on Plan in Appendix 1)
Plan:	NHRR-RAM-HGN-HYKE-DR-CH-00011 P04
Summary:	Single lane approach increases to four lanes over a short distance resulting in late lane changes and side-swipe collisions with personal injury occurring.
The southbound A46 approach to the Hykeham Roundabout diverges from a single lane carriageway into four lanes over a short distance of approximately 40 metres and a physical separation island is to be provided between lanes 2 and 3. There is a concern that the rapid increase in the number of lanes may result in late / sudden lane changing manoeuvres being undertaken with possible vehicle / vehicle or vehicle / splitter island side-swipe or loss of control type collisions occurring leading to personal injury. It is noted that the speed limit on the A46 in this location is the national speed limit (60mph).	
RECOMMENDATION	
It is recommended that the transition length (distance) over which the single lane diverges into four lanes should be increased and advance road signing and markings should be provided to indicate to drivers the layout of the roundabout junction ahead, along with the possible destinations, so that early decisions can be made leading to better lane discipline.	

PROBLEM 2 NH	
Location:	A46 southbound carriageway north of Hykeham Roundabout (Location 2 NH on Plan in Appendix 1)
Plan:	NHRR-RAM-HGN-HYKE-DR-CH-00011 P04
Photograph	Photo E (Appendix 2)
Summary:	Limited space available to provide adequate advance road signing for drivers approaching Hykeham Roundabout leading to possible driver confusion with late lane changing and side-swipe type collisions occurring with personal injury.
There appears to be limited (verge) space available to allow adequate advance road signing to be installed for A46 southbound drivers approaching Hykeham Roundabout from the north. This may result in driver confusion and late decision making and lead to late lane changing resulting in side-swipe type collisions occurring with personal injury.	
RECOMMENDATION	
It is recommended that sufficient space should be made available so that clear advance wayfinding signs can be provided for drivers approaching the roundabout junction. Where land availability issues may exist an alternative means of communicating the numerous lanes and destinations approaching drivers could take should be provided.	

ROBLEM 3 NH	
Location:	A46 southbound carriageway towards Hykeham Roundabout (Location 1 NH on Plan in Appendix 1)
Plan:	NHRR-RAM-HGN-HYKE-SK-CH-00015 P01
Summary:	The southbound A46 lane 1 (ahead and left indicated) entry path radius appears greater than 100m and may result in high vehicle speeds resulting in a loss of control type collisions with personal injury.
Although it is recognised that the roundabout junction will be signalised drivers travelling southbound via the A46 lane 1 (ahead and left indicated) may receive a 'green wave' and may not therefore need to appreciably reduce their speed. The entry path radius from this lane appears to be greater than 100m which may result in high vehicle entry speeds resulting in a loss of control type collisions with personal injury occurring. The audit team note from the RSA brief that no departures from standard have been applied for in relation to this scheme.	
RECOMMENDATION	
It is recommended that measures are introduced to avoid high vehicle speeds on all entry arms of the roundabout.	

5. ITEMS RAISED AT THIS REPEAT STAGE 1 ROAD SAFETY AUDIT RELATING TO BOTH THE NH AND THE LCC HIGHWAY NETWORK

PROBLEM 1 NH LCC	
Location:	Middle Lane – Southern entrance to service area (Location 1 NH LCC on Plan in Appendix 1).
Plan:	NHRR-RAM-HGN-HYKE-DR-CH-60101 P01
Summary:	Entrance to service area (right turn lane) is in close proximity to the roundabout junction which may result is shunt/side-swipe type collisions and personal injury.
The diverge right-turn lane and entrance to the service area is less than 30m from the roundabout gyratory which may result in shunt/side-swipe type collisions taking place as vehicles leaving the roundabout suddenly brake to turn right into the service entrance or they are unable to maintain the required lane discipline. Furthermore, the vehicle tracking drawing shows the turning manoeuvre NHRR-RAM-HGN-HYKE-DR-CH-60101) overrunning both lane markings and the offside hatch markings indicating insufficient road space for this manoeuvre to be satisfactorily undertaken and leading to sharp turns with loss of control and possible personal injury occurring. It is noted that the layout that was the subject of the original Stage 1 RSA proposed to relocate the entrance to the service area away from the roundabout, and only exiting was permitted in close proximity to the roundabout junction.	
RECOMMENDATION	
It is recommended that the entrance should be relocated further from the roundabout junction and clear advance signing directing drivers to the service area should be provided.	

PROBLEM 2 NH LCC	
Location:	Middle Lane – Proposed NUM route (combined footway/cycleway) (Location 2 NH LCC on Plan in Appendix 1).
Plan:	NHRR-RAM-HGN-HYKE-DR-CH-00011 P04
Photograph	Photo A (Appendix 2)
Summary:	Risk of NMU / vehicle collisions when crossing Middle Lane to access proposed combined NMU facilities with possible personal injury.
NMUs crossing Middle Lane, i.e. from the service area and the realigned footpath (TOTH/17/1) to the combined NMU facilities proposed as part of the works are provided with no means to safely cross this carriageway. There is a concern that NMUs may attempt to cross at an inappropriate location leading to trip, falls or collisions with passing vehicles. This may lead to personal injury.	
RECOMMENDATION	
Appropriate crossing facilities of Middle Lane with wayfinding should be provided to allow connectivity to other proposed at-grade NMU facilities forming part of this scheme.	

PROBLEM 3 NH LCC	
Location:	Hykeham Roundabout splitter islands (Location 3 NH LCC on Plan in Appendix 1).
Plan:	NHRR-RAM-HGN-HYKE-DR-CH-00011 P04
Summary:	No NMU routes (combined footway/cycleway) have been indicated across the various roundabout splitter islands. This may result in trips/falls or NMUs being struck by a passing vehicle resulting in personal injury.
No NMU routes (combined footway/cycleway) have been indicated across the various roundabout splitter islands forming part of the proposed works. A lack of connectivity between crossing facilities may result in NMU confusion while crossing the various splitter islands and lead to NMUs taking short-cuts with a risk of trips/falls or being struck by a passing vehicle resulting in personal injury.	
RECOMMENDATION	
Appropriate routes across splitter islands with wayfinding should be provided for NMUs.	

PROBLEM 4 NH LCC	
Location:	A1434 Newark Road westbound carriageway towards Hykeham Roundabout near side entry radius (Location 4 NH LCC on Plan in Appendix 1).
Plan:	NHRR-RAM-HGN-HYKE-DR-CH-00011 P04
Summary:	W/B near side entry radius is 'tight' and this may result in side-swipe type collisions occurring.
The A1434 Newark Road on the W/B approach to Hykeham Roundabout consist of a nearside entry radius which is approximately 20m. This left-hand radius is then followed by an opposing right hand radius curve associated with the roundabout gyratory. This nearside horizontal alignment may result in poor lane discipline and vehicles heading towards the exit to NHRR and not keeping to lane 1 of the gyratory. The lack of lane discipline may result in vehicles drifting into an opposing lane with a subsequent risk of side-swipe type collisions occurring with personal injury. It is noted that there is not a vehicle swept path shown for this manoeuvre on the tracking drawings provided.	
RECOMMENDATION	
Provide a nearside horizontal alignment that avoids the risk of vehicles drivers not maintaining the correct lane discipline. The manoeuvre should be tracked at an appropriate vehicle speed.	

PROBLEM 5 NH LCC	
Location:	A46 verges / Middle Lane northern verge unofficial worn path (Location 5 NH LCC on Plan in Appendix 1).
Plan:	NHRR-RAM-HGN-HYKE-DR-CH-00011 P04
Photograph	Photos B and C (Appendix 2)
Summary:	Risk of NMU / vehicle collisions while crossing A46 between services area and restaurant.
During the site visit the Audit Team noted that there is a well-worn track along the northern verge of Middle Lane (leading from the Travel Lodge Hotel) up to the western side of the A46. The worn track continues on the eastern side of the A46 up to the 'Hickory Smokehouse' restaurant. The scheme proposals do not appear to accommodate the associated existing pedestrian movements which post-completion will result in longer crossing distances owing to the increased number of lanes. Should these movements continue with no dedicated specific crossing facilities being provided across the A46, there is a concern that pedestrian/vehicle conflicts may occur leading to pedestrian injury.	
RECOMMENDATION	
It is recommended that appropriate NMU crossing facilities should be provided to cater for the existing user demand.	

PROBLEM 6 NH LCC	
Location:	A46 S/B approach the Hykeham Roundabout (Location 6 NH LCC on Plan in Appendix 1).
Plan:	NHRR-RAM-HGN-HYKE-DR-CH-00011 P04
Summary:	Limited visibility to both primary traffic signals may result in shunt type collisions occurring.

The southbound A46 approach to the Hykeham Roundabout consists of a four lane entry together with the Subsidiary Deflection Island (SDI) at the stop line, the overall carriageway width being approximately 18m. The Audit Team accepts that at least one primary traffic signal shall be visible for an approaching driver at a distance equivalent to the stopping sight distance (SSD).

Whilst two primary signals are expected to be provided at the stop line, with both likely to be displaying the same information, there is a concern that given the wide entry drivers wishing to access Lanes 1 and 2 will be focusing their attention more on the nearside rather than the off-side primary traffic signal which itself could be obscured by queuing vehicles.

No SSD drawing has been provided within the RSA Brief but there is a concern that forward visibility to the nearside primary signal may be masked by vegetation or development beyond the red line boundary. The lack of forward visibility, especially to the nearside primary signal may result in drivers failing to see queuing traffic with a subsequent risk of shunt type collisions occurring with personal injury.

It is noted that the speed limit on the A46 in this location is the national speed limit (60mph).

RECOMMENDATION

It is recommended that measures are introduced to reduce the risk of shunt type collisions due to queuing traffic, or late breaking for a red aspect traffic signal.

PROBLEM 7 NH LCC	
Location:	Hykeham Roundabout circulatory carriageway (Location 7 NH LCC on Plan in Appendix 1).
Plan:	NHRR-RAM-HGN-HYKE-DR-CH-01020 P06
Summary:	Limited forward visibility at entry and on the circulatory carriageway may result in shunt type collisions occurring.

The drawing information provided indicates that landscaping planting his to be provided and that some of the visibility splays may encroach into the landscape areas of the central island. During the growing season the required forward visibility may not be achievable resulting in shunt type collisions occurring with personal injury.

It is noted that there are no stopping sight distance drawings provided within the RSA brief.

RECOMMENDATION

It is recommended that measures are introduced to reduce the risk of shunt type collisions, or late breaking for a red aspect traffic signal.

PROBLEM 8 NH LCC	
Location:	NHRR N/B approach the Hykeham Roundabout (Location 8 NH LCC on Plan in Appendix 1).
Plan:	NHRR-RAM-HML-HYKE-DR-CH-01020 P06
Summary:	Limited visibility to both primary traffic signals may result in shunt type collisions occurring.
The NHRR on the N/B approach to Hykeham Roundabout consists of a two-lane segregated left turn lane (SLTL) with a left diverge arrow provided at the diverge taper. Drivers may not have sight of either primary signals associated with the SLTL at the desirable minimum stopping sight distance with both signals possibly being masked by vegetation on the approach to the junction. The lack of forward visibility of both signals may result in vehicles failing to see queuing traffic with a subsequent risk of shunt type collisions occurring with personal injury. It is noted that there are no stopping sight distance drawings provided within the RSA brief.	
RECOMMENDATION	
It is recommended that measures are introduced to reduce the risk of shunt type collisions due to queuing traffic, or late breaking for a red aspect traffic signal.	

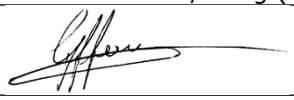
PROBLEM 9 NH LCC	
Location:	NHRR N/B approach the Hykeham Roundabout (Location 9 NH LCC on Plan in Appendix 1).
Plan:	NHRR-RAM-HML-HYKE-DR-CH-01020 P06
Summary:	2 lane diverge onto SLTL may result in side-swipe type collisions occurring.
The NHRR on the N/B approach to Hykeham Roundabout consists of a two-lane segregated left turn lane (SLTL) with a left diverge arrow provided at the diverge taper. Drivers may diverge in a poor lane disciplined manner resulting in side-swipe type collisions occurring. It is noted that multi-lane SLTL are not permitted in the design standard DMRB CD116 and no departure from standard has been referenced within the RSA Brief.	
RECOMMENDATION	
It is recommended that measures are introduced to reduce the risk of side-swipe type collisions due to the provision of a multi-lane SLTL.	

6. ITEMS RAISED AT THIS REPEAT STAGE 1 ROAD SAFETY AUDIT RELATING TO THE LINCOLNSHIRE COUNTY COUNCIL (LCC) HIGHWAY NETWORK

These have been included within Section 5, "Items Raised at This Repeat Stage 1 Road Safety Audit relating to both the NH and the LCC Highway Network" due to the close proximity of the NH road network.

7. RSA TEAM STATEMENT

We certify that this Road Safety Audit has been carried out in accordance with GG 119.

ROAD SAFETY AUDIT TEAM LEADER	
Name:	Simon Hawley, BEng (Hons), CEng, MICE, MCIHT, MSoRSA, CofC
Signed:	
Position:	Director of Infrastructure & Highways
Organisation:	Ramboll Limited, 240 Blackfriars Road, London SE1 8NW
Date:	24th May 2024
ROAD SAFETY AUDIT TEAM MEMBER	
Name:	Graeme Turner, BEng (Hons), MSoRSA
Signed:	
Position:	Associate
Organisation:	Glanville Consultants Limited, Cornerstone House, 62 Foxhall Road, Didcot, Oxon OX11 7AD
Date:	24th May 2024

APPENDIX 1 – PROBLEM LOCATION PLAN

Notes

1. DO NOT SCALE FROM THIS DRAWING.
2. ALL DIMENSIONS ARE IN METRES UNLESS SHOWN OTHERWISE.
3. ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM UNLESS SHOWN OTHERWISE.
4. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.

P03

PROBLEM 1 NH
PROBLEM 2 NH
PROBLEM 3 NH
PROBLEM 3 NH LCC
PROBLEM 4 NH LCC
PROBLEM 5 NH LCC
PROBLEM 6 NH LCC
PROBLEM 7 NH LCC
PROBLEM 8 NH LCC
PROBLEM 9 NH LCC

RED LINE BOUNDARY EXTENSION TO ALLOW FOR INSTALLATION OF STREET LIGHTING
RED LINE BOUNDARY EXTENSION TO ALLOW FOR REMOVAL EXISTING FOOTPATH AND PEDESTRIAN BRIDGE
NATIONAL GRID ENERGY TRANSMISSION PYLON - 400kV
MAINTENANCE ACCESS/ PRIVATE MEANS OF ACCESS (PMA)
CONNECTION TO EXISTING FOOTPATH SHYK/9/2
WILDLIFE POND WITH MARGINAL PLANTING
NMU ROUTE COMBINED FOOTWAY / CYCLEWAY
NEWARK RD (A1434)
NORTH HYKEHAM ROAD ROUNDABOUT
ENTRANCE TO SERVICES
ACCESS TO SERVICES
MIDDLE LANE
REALIGNED FOOTPATH TOTH/17/1
ACCESS/ PRIVATE MEANS OF ACCESS (PMA)
ATTENUATION POND
EXISTING NMU ROUTE
SOUTH HYKEHAM CATCHWATER (UPPER WITHAM IDB)
SITE COMPOUND LOCATION AND ACCESS
A46
348,370 mm
232m
200m
150m
100m
50m
00m
FOR CONTINUATION REFER TO SHEET 2
FOR CONTINUATION REFER TO SHEET 10

INSET A: FULL EXTENT OF RED LINE BOUNDARY
NTS

10m 0m 10m 30m 50m 70m 90m
SCALE 1:1250

LCC & NH PROBLEM LOCATION PLAN

Drawing Legend:

- EXISTING BACKGROUND MAPPING
- PROPOSED DESIGN
- RED LINE BOUNDARY
- PROPOSED CARRIAGEWAY
- PROPOSED TRAFFIC ISLAND / CENTRAL RESERVE / HARDSTANDING
- PROPOSED NMU ROUTE COMBINED FOOTWAY / CYCLEWAY
- PROPOSED ACCESS TRACK - MAINTENANCE / PRIVATE MEANS OF ACCESS (PMA)
- PROPOSED ACCESS TRACK / BRIDLEWAY MAINTENANCE / PRIVATE MEANS OF ACCESS (PMA)
- PROPOSED FOOTWAY
- PROPOSED MAINTENANCE LAYBY
- PROPOSED FOOTPATH
- WOODLAND PLANTING
- WOODLAND EDGE PLANTING
- NATIVE TREE PLATNING
- NATIVE HEDGEROW
- AMENITY GRASSLAND
- WILDFLOWER ENRICHED GRASSLAND
- WET GRASSLAND
- DITCH / WATERCOURSE
- MARGINAL PLANTING
- CONSTRUCTION HAUL ROUTE (INDICATIVE)
- INDICATIVE COMPOUND / PROCESSING AREA
- LAND RETURNED TO AGRICULTURE
- 1 1 NOISE BARRIER
- EX INDICATIVE LOCATION OF EXOLUM DIVERSION

Sheet Location Plan:

	Drawn	Checked	Approved	Date

Suitability: S5
Drawing Status: Suitable for Review & Acceptance

Project Name: North Hykeham Relief Road

Project Client: Lincolnshire County Council – Working for a better future

Project Contractor: Balfour Beatty

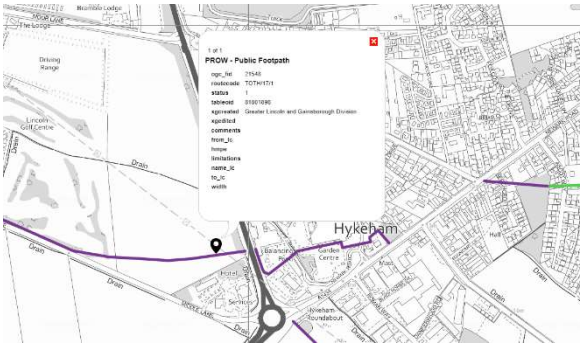
Project Designer: RAMBOLL
tel 01244 311855 chester@ramboll.co.uk
www.ramboll.co.uk

Drawing Title: LCC & NH PROBLEM LOCATION PLAN

Project No:	Scale (@A1):	Drawn:	Date:
1620013942	1:1250	DB	19/03/24

Drawing No: Rev:

APPENDIX 2 – PHOTOGRAPHS TAKEN DURING SITE VISIT AND FROM GOOGLE STREETVIEW



Credit. Lincolshirew County Coucil

Photo A – PRoW TOTH/17/1 details

Photo B – Worn verge/embankment looking west towards A46

Photo C – Worn verge - A46/Middle Lane verge looking south

Photo D – Not used

Photo E – Existing A46 southbound ADS
Credit. Google Streetview

Credit. Road Safety Audit Team Observations/Google Streetview